

# Biogas Scrubber for Municipal and Industrial Waste Streams

*“Ministry of Environment and Energy assistance really helped Apollo to develop its unique biogas scrubbing process.”*

Peter Walton  
President, Apollo  
Environmental Systems Corp.  
Willowdale, Ontario

## THE COMPANY

Apollo, founded in 1988, uses unique proprietary technology to solve the problems of environmental contamination in waste streams and industrial processes effectively and competitively. The company has developed a number of applications for its technology and is now entering commercial operations.

## THE CHALLENGE

There are almost 1,400 wastewater treatment plants in Canada and about 13,000 in the USA. About 10 per cent of the Canadian plants and 25 per cent of the American plants use anaerobic digestion to reduce the volume of sludge requiring disposal. This process produces a biogas which is composed of mostly methane and carbon dioxide and is contaminated with small quantities of other gases. Hydrogen sulphide is one of these gases.

Hydrogen sulphide is a health and safety hazard in plant operations. The gas has an unpleasant odor and, when combined with carbon dioxide and water vapor, corrodes plant equipment and piping. Further, hydrogen sulphide and other sulphur compounds must be removed from anaerobic digester gas streams before they can be used as fuel for boilers, stationary engines and cogeneration units.

## SOLUTION

Apollo has designed, built and evaluated a scrubber to remove hydrogen sulphide and particulate



*Prototype biogas scrubber*

matter from biogas. The prototype scrubber was installed and tested at the Metropolitan Toronto Works Department's Main Treatment Plant at Ashbridges Bay.

Results from the continuous operation field evaluation showed that the scrubber removed about 98 to 99 per cent of the hydrogen sulphide.

Apollo's process is based on a patented high efficiency, gas-liquid contactor which uses a liquid reduction/oxidation process to convert hydrogen sulphide to elemental sulphur and water. The process is robust, inexpensive and easy to operate. The catalyst, reaction products and buffer additive are all environmentally acceptable.

Apollo gas scrubbers meet all environmental standards for removing hydrogen sulphide. Further, the scrubbers:

- ✧ eliminate noxious odors and sulphur dioxide emissions;
- ✧ save money by reducing corrosion and downtime and by extending equipment's lifespan.

## OPPORTUNITIES

Apollo's biogas scrubbers may be used in other places where biogas is produced, such as landfill sites and industrial anaerobic digesters.

Industrial digesters are used on the wastewater streams produced by industries such as rendering, food processing, beverage manufacturing and pulp and paper. In many cases, the level of hydrogen sulphide in the biogas from industrial anaerobic digesters is higher than that from the anaerobic digesters in municipal waste treatment plants.

In addition, the upgraded biogas may be used as a low-energy content fuel to fuel boilers and produce heat for the plant digestion tanks as well as the control buildings.

## PARTNERSHIP IN POLLUTION PREVENTION AND RESOURCE CONSERVATION

Industrial companies located in Ontario may seek in ministry/industry services that will help them to:

- ✧ reduce, reuse and recycle solid waste;

- ✧ reduce or eliminate liquid effluent and gaseous emissions;
- ✧ use energy and water more efficiently.

Equipment and services supply companies can benefit from the information provided on technologies identified for business development.

### **FOR FURTHER INFORMATION, PLEASE CONTACT:**

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*Scrubber in operation*

### **MINISTRY OF ENVIRONMENT AND ENERGY SERVICES**

For further information on Ministry of Environment and Energy assistance to industry, please contact the Industry Conservation Branch at (416) 327-1492, Fax (416) 327-1261.

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